CRT-150

Relationship Between Body Mass Index and Severity of Coronary Artery Disease

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Background: Obesity is a major risk factor for diabetes, hypertension and coronary artery disease (CAD). Relation between BMI and severity of CAD is matter of controversy. Our aim was to study relation between obesity assessed with BMI and severity of CAD assessed with invasive coronary angiography (ICA).
Methods: 415 consecutive patients who underwent (ICA) for different indications included in the study. Coronary stenosis > 50 or more considered significant. Severity of CAD was classified into single, two and three vessels disease. Left main affection was classified as separate category. BMI was calculated and patients classified as Normal (BMI 20-24.9 kg/m^2), overweight (BMI 25-29.9 kg/m^2) and obese (BMI > 30 kg/m^2). Findings of ICA compared with classes of BMI.
Results: The mean BMI was 31.2 ± 4.8 kg/m^2. Clinical characteristics and ICA results are shown in table 1. The mean number of diseased vessels was 1.45 in all BMI classes (p = 0.73). Multivariate analysis revealed no significant association between BMI and severity of CAD. Table 2
Conclusion: BMI was not related to severity of CAD. Lager studies are needed to confirm our results.

Table 1. Patients' clinical characteristics and ICA results.

	Normal weight N = 89	Over weight N = 121	Obese N= 205	P value
Age Mean ± SD	65 ± 8.3	58 ± 9.1	55 ± 10.2	NS
MALE	58 (73%)	85 (70.3 %)	144(70.2%)	NS
SMOKERS	28 (31.5 %)	37 (30.5%)	81(39.5%)	NS
HYPERTENSION	43 (48.3%)	78 (64.4%)	154 (75.2%)	0.000
DM	15 (16.8%)	25 (20.6%)	62 (30 %)	0.001
DYSLIPDEMIA	41 (46%)	56 (46.3%)	155 (75.6 %)	0.001
3 VESSEL DISEASE	22 (24.7 %)	25 (20.6 %)	48 (23.4%)	0.75
LEFT MAIN DISEASE	4 (4.4%)	5 (4.1%)	11 (5.3%)	0.92

Table 2. Multivariate analysis for risk of 3 vessels and left main disease.

	3 VESSELS DISEASE			LEFT MAIN DISEASE		
	ODDS RATIO	95 % CI	P VALUE	ODDS RATIO	95 % CI	P VALUE
Over WEIGHT	1.23	0.65- 2.2	0.75	0.84	0.25-3.28	0.65
Obese	1.12	0.65-2.0	0.82	1.01	0.34-3.65	0.72
Hypertension	0.94	0.52-1.62	0.001	1.05	0.32-1.45	0.6
DM	3.1	1.9-5.7	0.000	1.03	0.35-2.88	0.83
Dyslipidemia	1.1	0.98- 2.86	0.002	0.67	0.74-2.92	0.74

CRT-151

Coronary Artery Calcium Score as a Predictor of Major Adverse Cardiovascular Events Following Revascularization

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Background: A quantitative association between pre-procedural coronary artery calcium (CAC) and revascularization outcomes has yet to be described. The objective of this study was to determine the association between pre-procedural CAC and major adverse cardiovascular events (MACE) after patients have undergone revascularization via percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG).
Methods: Seventy-three patients were enrolled in a retrospective cohort who underwent CAC scoring via Electron Beam or Multi-detector Computerized Tomography prior to surgical or percutaneous revascularization. CAC scoring was computed using Agatston's method. MACE was defined as cardiovascular death, myocardial infarction or target vessel revascularization (TVR). Medians were compared using the Mann-Whitney test with significance defined at p<0.05. Odds ratios (OR) and 95% confidence intervals (CI) were calculated for TVR using Fisher's exact method. Multivariate analysis was performed to identify independent associations for MACE. Follow-up was obtained via our electronic health record.
Results: 745 PCI's and 279 CABG's were reviewed over a six year period from 2005-2010. 38 PCI and 35 CABG patients met inclusion criteria. For the PCI cohort, 54 vessels were stented, median age was 60 years, median follow-up was 37 months and 8 patients suffered MACE. The median CAC score was 622 for those who experienced MACE versus 188 without MACE (p=0.03). For the CABG cohort, 95 vessels were grafted, median age was 64 years, median follow-up was 30 months and 6 patients suffered MACE. The median CAC score was 1524 for those who experienced MACE versus 434 without MACE (p=0.01). Patients with a CAC score > 400 were more likely to undergo TVR after PCI (OR=6.0, 95% CI 1.02-35.34, p=0.04), but not CABG (OR=2.14, 95% CI 0.33-13.58, p=0.65). CAC scores were not independently associated with MACE for either CABG or PCI patients on a multivariate analysis including CAC, age, hypertension, diabetes mellitus, hyperlipidemia, stent diameter, or stent length.
Conclusions: This data supports the association of elevated CAC scores and MACE following revascularization in both PCI and surgical patients. Elevated CAC scores > 400 were associated with TVR in the PCI group, but not in the CABG group. Increased CAC score was not found to be an independent predictor of MACE. Further investigation with a larger study population is warranted to determine independent predictors of MACE following revascularization in patients with elevated CAC scores.

CRT-153

Predictors of Recurrent Chest Pain in Patients with Vasospastic Angina Based on 3-year Clinical Outcomes

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Background: Coronary artery spasm (CAS) is a major cause of myocardial ischemia. However, long-term clinical outcomes of CAS are largely unknown. We investigated predictors of recurrent chest pain in patients (pts) with vasospastic angina based on 3-year clinical outcomes.
Methods: A total of 2,797 consecutive pts without significant coronary artery disease who underwent Acetylcholine (Ach) test were enrolled between Nov 2004 and Oct 2010.
Results: Ach test revealed 1,609 (57.5%) CAS positive pts [male; n=823 (51.1%), age; 55.0 (interquartile, 47.5-63.2)]. Baseline characteristics included hypertension [n= 663 (41.2%)], diabetes [n=193 (11.9%)], dyslipidemia [n=241 (14.9%)], current smokers [n=395 (24.5%)] and current alcoholics [n=556 (34.5%)]. Ach provocation test showed the incidence of myocardial bridge [n=434 (26.9%)], baseline CAS [n= 495 (30.7%)], diffuse CAS [n=1344 (83.5%)] and multi-vessel spasm [n=555 (34.4%)]. After 3 years, recurrent chest pain [n=102 (6.3%)] was the most common event. Other events included all-cause death [n=3 (0.1%)], cardiac death [n=2 (0.1%)], myocardial infarction [n=3 (0.1%)], percutaneous coronary intervention [n=3 (0.1%)] and cerebrovascular accidents [n=3 (0.1%)]. Multivariate analysis showed dyslipidemia (OR; 1.75, 95% C.I; 1.07-2.85, p=0.025) and baseline CAS (OR; 1.91, 95% C.I; 1.26-2.88, p=0.002) to be strong independent predictors of recurrent chest pain (Table).
Conclusion: Dyslipidemia and baseline CAS were predictors of recurrent chest pain in 3-year clinical outcomes. Therefore pts who have dyslipidemia or show baseline CAS should receive intensive anti-anginal management and close clinical follow up.

Table. Predictors of Recurrent Chest Pain based on 3-year Clinical Outcomes.

Variable	Multivariable analysis Odds Ratio (95% C.I)	P Value
Age	1.00 (0.98-1.02)	0.351
Male	1.39 (0.84-2.29)	0.188
Body mass index	0.96 (0.89-1.03)	0.290
Hypertension	1.01 (0.65-1.55)	0.958
Diabetes	1.07 (0.59-1.96)	0.809
Dyslipidemia	1.75 (1.07-2.85)	0.025
Current Smokers	1.32 (0.79-2.21)	0.280
Current alcoholics	0.77 (0.48-1.24)	0.296
Family history of CAD	0.50 (0.12-2.05)	0.337
Myocardial bridge	1.04 (0.65-1.68)	0.846
Baseline CAS (narrowing >30%)	1.91 (1.26-2.88)	0.002
Diffuse CAS (length >30mm)	1.48 (0.77-2.84)	0.239
Multi-vessel CAS	1.26 (0.83-1.93)	0.271
FCL	1.31 (0.85-2.03)	0.213

* CAD indicates coronary artery disease, CAS; coronary artery spasm, FCL; Fixed atherosclerotic -coronary lesion.

CRT-154

The Role of Cardio-Ankle Vascular Index (CAVI) as an Indicator of the Severity of Coronary Artery Disease - Virtual Histology Intravascular Ultrasound Analysis

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Background: Cardio-Ankle Vascular Index (CAVI) was developed as a parameter of atherosclerosis that does not depend on the blood pressure than pulse wave velocity (PWV). We assessed the predictive value of CAVI as an indicator of coronary artery disease and whether it reflects the severity of CAD.
Method: We assessed CAVI in 474 patients before undergoing coronary angiography. 207 patients had normal coronary angiogram, and 267 patients were confirmed to have coronary artery disease. IVUS analysis of the culprit lesion was done. VH-IVUS-defined thin-capped fibroatheroma (VH-TCFA) had necrotic core (NC) >10% of plaque area, plaque burden >40%, and NC in contact with the lumen for ≥3 image slices.
Results: CAVI was higher in patients with coronary artery disease than normal patients (8.96±1.54 vs 8.03±1.39, p=0.03). Among patient with coronary artery disease, patients with multi-vessel disease showed higher value of CAVI (8.76±1.53 vs 8.23±1.26, p=0.001). IVUS analysis of the culprit lesion was amenable in 102 pts who were divided into 2 groups: CAVI< 9(52pts) and CAVI≥ 9(50pts). While minimal lumen area, plaque burden and remodeling index were similar, lesion length were longer in CAVI ≥ 9 group. CAVI showed correlation with lesion length (r=0.615, p<0.001), whereas not with minimal lumen area (r=-0.048, p=0.672). Among 4 components (fibrotic, fibrofatty, necrotic, calcium), lesion maximal calcium (%) was higher in CAVI ≥ 9 group and also showed correlation with CAVI (r=0.521, p<0.001). The frequency of VH-TCFA phenotype was similar between the two groups (19/52 (36.5%) vs 17/50(34%), p=0.263).
Conclusions: High CAVI value might suggest more severe (longer lesion length) and greater coronary artery disease complexity (more calcified coronary plaque).

	CAVI < 9 (n=52)	CAVI ≥ 9 (n=50)	P value
Lesion length (mm)	15.94±5.86	20.68±5.76	<0.001
Distal reference lumen area (mm^2)	6.71±3.28	7.03±2.52	0.619
MLA lumen area (mm^2)	2.66±1.15	2.59±0.84	0.941
MLA plaque burden (%)	78.37±8.58	78.78±7.60	0.823
Remodeling index (MLA site)	0.84±0.18	0.78±0.16	0.117
Necrotic core (%) (max. NC site)	33.87±9.41	32.83±9.09	0.614
Dense calcium (%) (max. NC site)	9.12±8.02	9.82±7.18	0.682
Lesion Max. dense calcium (%)	11.48±10.43	18.71±10.59	0.003

CRT-155

Forced Diuresis with Matched Hydration Using the Renalguard® System for the Prevention of Contrast Induced Acute Kidney Injury - A Single Center Experience

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Background: Contrast-induced acute kidney injury (CI-AKI) is a frequent complication of coronary angiography associated with unfavorable outcome. Recently, two randomized controlled trials have demonstrated that furosemide induced diuresis with matched isotonic intravenous hydration using the RenalGuard system reduces the risk of CI-AKI in high-risk patients undergoing coronary procedures. The efficacy and safety of this strategy has never been reported in real life practice.
Methods: We analyzed data of patients at high risk to develop CI-AKI who were hospitalized in our cardiology department for acute coronary syndrome from August 2012 to September 2013 and were treated with the RenalGuard system during coronary angiography with or without angioplasty. The AKI rate was compared to a novel tool for accurate prediction of CI-AKI.
Results: 51 high risk patients were enrolled, 66% males, mean age of 74 ± 9 years, 93% where hypertensive and 55% were diabetics. Mean ejection fraction was 46±13%, mean eGFR was 37±13 ml/min/1.73m^2 and mean baseline hemoglobin was 11.4±1.8 g/dL. The mean volume of contrast media delivered was 84±34 ml (25 - 172). According to a novel prediction tool patients in this group had a calculated risk of 10.5% for CI-AKI and 1.4% risk of requiring dialysis.

Forced dieresis was achieved with mean IV normal saline bolus of 260±70 ml, and mean IV furosemide of 55±38 mg, achieving a mean urine rate of 443±258 ml/hr at the beginning of the procedure. Monitored by the RenalGuard system patients received a mean IV hydration saline of 2209 ± 1154 ml closely matched to mean urine output of 2486±1173 ml, during a mean time of 5 hours and 45 minutes.

3 patients (5.8%) developed CI-AKI as defined by >0.5 mg/dl or >25% rise in serum creatinine at 48-72 h post contrast administration and non required dialysis. 2 Patients (3.9%) developed dyspnea during the treatment, and one patient (1.8%) had peripheral venous catheter phlebitis. There was no urinary tract infection, no hypokalemia and no hypernatremia in 48-72 hours following the procedure.
Conclusion: Forced diuresis with matched IV hydration is safe and reduces the risk of CI-AKI in real world high risk patients.

CRT-157

Percutaneous Treatment of Refractory Heart Failure Secondary to Old Myocardial Infarction by Anteroapical Splinting Stent in the Left Anterior Descending Coronary

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Background: Determine the therapeutic effect of splinting with stenting the LAD. Improve the NYHA functional class. Improve the ejection fraction.
Methods: A total of 48 patients between 62 and 74 years old, 31 men and 17 women, from October 2009 through February 2013. We established a randomized study, 2 groups each one with 24 patients. All patients suffered refractory heart failure with left fraction ejection less than 30% in class III and IV (NYHA classification). Transthoracic echocardiogram was performed at admission, 6 and 12 months, nuclear imagine was done the day after improving their medical conditions, all studies shows no viability in this territory and coronary angiography was done the next day. All patients suffered from LAD disease only, and the vessel was patent in every one. We deliver bare metal stents from distal to proximal, the stents used are from 2.5mm to 3.5mm in diameter and 28 to 36mm long. We performed coronary angiography and ventriculography by femoral access then in the most severe lesions we made angioplasty before delivering the stents as we mentioned. All stents were spliced together with 5 mm each from distal to proximal just to the main lesion. All patients are reassessed clinically each month and an echocardiography study was performed at 6 and 12 months.
Results: The functional class improves in all the patients from the experimental group (24 patients), 21 patients pass to II functional class and only 3 patients stayed in III